

**ABSTRACT**

A process for preparing a broad molecular weight polyethylene carried out in the presence of a catalyst system comprising (i) a solid catalyst component comprising Mg, Ti, halogen, and optionally an internal electron donor compound, and (ii) an Al-alkyl cocatalyst said process comprising at least two step of polymerization (a) and (b), in which:

- in a first step (a) ethylene is polymerized in the presence of a molecular weight regulator in order to produce a ethylene (co)polymer, and

in a further step (b), which is carried out in the presence of an external electron donor compound added to this polymerization step as a fresh reactant, ethylene is copolymerized with an alpha olefin of formula  $\text{CH}_2=\text{CHR}$ , in which R is a C1-C20 hydrocarbon group, to produce an ethylene copolymer having a molecular weight higher than that of the copolymer produced in step (b).